COMPARING THE EFFICACY OF ONE LEGGED BRIDGING WITH AND WITHOUT HIP ABDUCTION USING A SLING ON CONTRALATERAL SIDE ON TRUNK STABILITY AND BALANCE IN POST STROKE PATIENTS

Dissertation submitted in

the Partial fulfillment

for the degree of

MASTER OF PHYSIOTHERAPY

(NEUROLOGY)

The Tamil Nadu Dr. M.G.R. Medical University

Chennai

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PSG COLLEGE OF PHYSIOTHERAPY

Coimbatore

PSG COLLEGE OF PHYSIOTHERAPY

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CERTIFICATE

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Internal Examiner **External Examiner**

Date of Evaluation:

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ABBREVIATIONS

MMSE	-	Mini Mental State Examination
MCA	-	Middle Cerebral Artery
TIS	-	Trunk Impairment Scale
BBS	-	Berg Balance Scale
EMG	-	Electromyography
WHO	-	World Health Organization

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CHAPTER-I

INTRODUCTION

Stroke is a major health problem in India. The prevalence of stroke in India was estimated as 203 per 100,000 populations above 20 years, amounting to a total of about 1 million cases.[1]

"*More than 40 years ago as "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin."*[2]**-*World Health Organization* (WHO).**

Hemiplegia is a main symptom of stroke [3], which results a decrease in trunk adjustment ability which in turn leads to complications such as a tendency to fall towards the paretic side and qualitative degradation of gait [4]. In hemiplegic patients, muscle function loss that result in balance disorder which disrupts their daily lives [5]. Neurological control of the trunk is dominated by the bilateral cerebral hemispheres, and a lesion on one side may affect both the sides of the trunk. Trunk muscle weakening has been attributed to an insufficient mobilization of high-threshold motor units and disuse of muscles [6].

Core stability is a kinetic chain activity necessary for the stabilization of trunk [7].**Berg Mark, et al**., [8] reported that core strengthening begins with the improvement in trunk stability that deep lumbar muscles are associated with which contribute to overall torque generation.

Bridging exercises are commonly used therapeutically for lumbopelvic stabilization [9] and is often used clinically, and much research has been conducted using diverse methods and modifications. Recently, attention has focused on changes in the activities of the trunk muscles during bridging exercises, and many studies have attempted to identify an efficient method for enhancing the activities of the trunk muscles [10]. According to the previous studies, the angle of the knee joint during bridging exercise affects the activity of the hip extensor muscles [11].

Unilateral bridging exercises at 0° angle of dominant knee while the non-dominant knee was held constant at 90° flexion could be increased activation of bilateral abdominal and contralateral semitendinosis and gluteus maximus than the angle of 120°,90°,60° was due to the balance against gravity when using one foot for a unilateral bridge exercise[12].

O'Sullivan, et al., [13] reported that performing exercise to stabilize the center of the pressure on an unstable base of support stimulated more proprioceptors and motor organs of the cerebrum and reactivate the muscles than exercise on a stable base of support. **Sangyong Lee, et al.,** [14] demonstrated that performing the bridge at a 120° knee angle led to greater increase in the external oblique, internal oblique and rectus abdominus muscle activities on an unstable surface than a stable surface.

Thus, Sling exercise training is an empirically proven exercise method [15] and recently used to facilitate the movement rehabilitation after stroke. It is a safe and partial body weight supported training and stabilizing the musculature by means of sensorimotor exercises, this therapy is based on the neuromuscular activation principle. This induces proprioceptive stimuli and activation of the whole muscles in closed kinetic chain exercise [16].

Hemborg, et al., [17] found that simultaneously contracting the hip joint muscles to facilitate the contractions of the pelvic and abdominal muscles and it can strengthen the deep muscles of the trunk, thereby enhancing trunk stability by reducing the load on the hip joint.

Kyuju Choi, et al., [18] provided evidence that performing bridge exercises with a sling and hip abduction has an effect on the trunk and lower extremity muscle activation in healthy subjects and it is presumed that these exercises may be clinically effective method for providing treatment for one side or for treating patients with Hemiplegia. Hence, this study was conducted to evaluate the efficacy in comparing with and without hip abduction using a sling on contralateral side to improve the trunk stability and balance in post stroke patients.

1.1 NEED FOR THE STUDY

Due to an increased prevalence of stroke, evaluating and implementing different types of rehabilitative intervention are needed. So the primary goal of this study is centered to

compare the effects of intervention such as two bridging exercises by one legged using a sling, with hip abduction bridging and without hip abduction bridging in post stroke patients.

Both the interventions are easily applicable and readily available than other form of rehabilitation intervention. And they promote better trunk stability in a early stage of rehabilitation to activate the muscles of trunk for balancing in sitting, standing and walking with an adequate posture and endurance in early stage of stroke.

So, selective trunk adjustment exercises are important and necessary and also it is prescribed as an intervention in recent rehabilitation. It is a necessity to study the beneficial, practical and effective method to deal with stroke patients.

1.2 OBJECTIVE

To compare the efficacy of with hip abduction and without hip abduction bridging on trunk stability and balance in post stroke patients.

1.3 HYPOTHESIS

Null hypothesis: There will be no significant difference in the comparison between the effects of one legged bridging with and without hip abduction using a sling on contralateral side on trunk stability and balance in post stroke patients.

Alternative hypothesis: There will be a significant difference in the comparison between the effects of one legged bridging with and without hip abduction using a sling on contralateral side on trunk stability and balance in post stroke patients.

1.4 OPERATIONAL DEFINITIONS

Trunk stability

Trunk stability is the ability to maintain active control of spinal and pelvic posture during dynamic loading and movement conditions. Such a definition implies that both neural control and muscle strength are important determinants of trunk stability. All the trunk muscles have an important role in stabilizing the trunk.

Pelvic bridging

Bridging exercise, a closed chain weight-bearing exercise is an exercise which plays a role in controlling the body balance and power to maintain the position. It is performed to promote coordinated contraction of global muscles and local muscles in a position, and to increase the muscle power of hip extensor group, and it can restore the trunk stabilization ability.

Balance

Balance can be defined as the ability to maintain the body's center of mass over its base of support and maintains equilibrium constantly during body movements and influences the most motions performed in daily living.

CHAPTER-II

REVIEW OF LITERATURE

- **Kyuju Choi, et al., 2016** conducted a cross sectional study to determine the effects of performing one legged bridge with hip abduction and the use of a sling on trunk and lower extremity muscle activation in healthy adults. In this study, 27 healthy individual (14 males and 13 females) are instructed to perform the bridge exercises under five different conditions (General bridge exercise, One legged bridging, one legged bridge with sling, one legged bridge with hip abduction and one legged bridge with hip abduction and sling) and concluded that there was a significant increase in muscle activation of erector spinae, external oblique, gluteus maximus and biceps femoris in contralateral side during one-legged bridge with a sling and one legged bridge with hip abduction conditions compared with the general bridge condition was measured using surface electromyography and suggested that these exercises may be clinically effective method for providing treatment for one side or for treating patients with Hemiplegia.[18]

- **Joo Young Hwang, et al., 2017** conducted a cross sectional study on the effects of performing hip abduction and adduction during bridging exercise on trunk and lower extremity muscle activity. In this study, 20 healthy young adults (10 males,10 females) was randomly selected and asked to perform three bridging conditions which were general bridge, bridge with IHAB and bridge with IHAD conditions on bilateral ES, GM, BF, and EO muscle activities through the use of surface electromyography. Bilateral ES and BF muscle activity increased were observed with hip adduction and increased GM activity was observed with hip abduction. Therefore, further research is needed to confirm the effects of isometric hip abduction and adduction on lumbar, abdominal, gluteals and lower extremity muscle activation especially for core muscle abnormalities and this is applicable within the clinical field for selective trunk and lower extremity muscle activation and advanced rehabilitation purposes.[19]

- **Juseung Kim, et al., 2016** conducted a study to investigate the changes in the activity of trunk and hip extensor muscles during bridge exercises with variations in unilateral knee joint angle among 22 healthy male subjects performed a unilateral bridge exercise in which knee joint angle at 0º, 120°, 90°, and 60° was measured using surface electromyography and that there was a higher activity of bilateral external oblique, internal oblique and gluteus maximus and in the contralateral semitendinosis with the unilateral bridge exercise at 0º knee flexion of dominant knee compared with bridging exercises performed at 120º, 90º or 60º knee flexion. This study attempted that limited evidence for the use of one sided muscular training for hemiplegic patients or patients with musculoskeletal disorders. Furthermore, bridge exercise performed with one leg may be used to train abdominal and hip extensor muscles.[12]

- **Sangyong Lee, et al., 2015** conducted a study to determine the bridge exercise performed on an unstable surface on lumbar stabilizing muscles according to the knee angle altered. Fifteen healthy adult men were selected and performed the bridge exercise on an unstable surface and a stable surface, with the knees at different angles (45°, 90° and 120°) were assessed and compared using electromyography. The results showed that bridging exercise at a 120° knee angle increased the external oblique, internal oblique and rectus abdominis muscle activities more on an US than on a SS used to increase in trunk instability, the EO, IO, and RA muscle activities and this indicated that the lumbar stabilizing muscle activity increased to ensure trunk stability for maintaining balance and future investigation to perform the bridge exercise on an US on trunk and lower extremity muscle activity according to the knee joint angle.[14]

- **Jae Hyo Park, et al., 2014** conducted a study to evaluate the trunk stabilization exercises using a sling on the balance among 40 patients resulting from stroke patients with hemiplegia were divided into a sling exercise group (SEG, n=20) and a mat exercise group (MEG, n=20). The SEG conducted the trunk stabilization exercise using a sling, and the MEG performed the trunk stabilization exercise on a mat. Both the groups received exercise thrice a week, 30 minutes per session for 8 weeks. The exercises also includes warm up and cool down phase. The biofeedback analysis system is used for the measurement of balance ability. However, study concluded that

trunk stabilization exercise using a sling as a clinical intervention aimed to improve the balance ability for stroke and useful for patients who need to improve postural adjustment and balance ability.[4]

- **Gui-bin Song, et al., 2015** conducted a study to verify the modified bridge exercise on balance ability on 30 patients who had a stroke were randomly allocated into a supine bridge exercise group (SBG, n=10), a supine bridge exercise on a TOGU balance pad group (SBTG, n=10), and a unilateral bridge exercise group (UBG, n=10). All groups received 20 minutes of training per day, five times per week for four weeks was measured using a biofeedback analysis system .The SBTG and UBG groups showed significant changes in balance ability but in particular, UBG group experienced the highest body weight bearing ability and COM shifting of PL and AL. That is, UBG group exercise was most suitable for balance control ability and concluded that bridging exercise was effective in improving the weight bearing in a standing position and improving balance on stroke patients.[10]

- **Lianghua Chen, et al., 2016** conducted a Metrological Analysis includes 9 studies with 460 participants and searched for randomized controlled trials of Sling Exercise Training on balance in patients with stroke. Berg balance Scale (BBS), Barthel index score (BI) and Fugl-Meyer Assessment (FMA) were used as independent parameters for evaluating balance function, activities of daily living (ADL) and motor function after stroke. Based on limited evidence from 9 trials, the SET treatment combined with conventional rehabilitation was superior to conventional rehabilitation treatments, with increased degrees of BBS, BI and FMA. So the SET treatment can improve the balance function after stroke.[16]

- **Joo Young Lee, et al., 2017** conducted a randomized controlled study to examine the Sling exercises on the quantitative balance function among 18 post-stroke patients (13 men and 5 women) were assigned into sling exercise (n=10) and control exercise (n=8) groups. The Sling Exercise (SE) group performed 30 minutes of the standardized SE program for the trunk and limb focusing on strengthening and neural control and Control Exercise (CE) group performed conventional exercise program

such as cycling or gait training, three times a week for 6 week were measured before and after training using the Good Balance System, Korean version of the Modified Barthel Index (K-MBI), Korean version of the Berg balance scale (K-BBS) and 10-m gait speed test were administered and concluded that sling exercise improved post-stroke balance performance and could be used as a therapeutic strategy to improve the post-stroke functional recovery. Moreover, sling exercise may be applicable in rehabilitative therapeutic strategy in the future.[20]

- **Jin Soo Lee, et al., 2014** conducted a study to investigate the sling exercise therapy (SET) using a closed kinetic chain exercises to activate trunk muscles and improve balance on 20 stroke patients were equally divided into 2 groups, a SET group and a control group that performed a regular exercises on a mat for 30 minutes, three times per week for 4 weeks was measured using surface electromyography, Berg Balance Scale, Frailty and Injuries Cooperative Studies of Intervention Technique, Timed Up & Go test, and Bio Rescue before and after exercises. Therefore, this study concluded that SET can be considered as an effective in strengthening the trunk muscles in stroke patients with chronic Hemiplegia.[21]

- **Sea hyun bae, et al., 2013** conducted a cross sectional study to examine the trunk stabilization exercise on different support surfaces on the trunk muscles and balance ability, among 16 stroke patients with onset of stroke six months earlier or longer were randomly and equally assigned to group I (exercise performed on a stable support surface) and group II (exercise performed on an unstable support surface) received exercises for five times per week for 12 weeks. Changes in the cross-sectional area (CSA) of the muscles and balance ability were examined and assessed using computed tomography (CT) and the trunk impairment scale, exercise on an unstable support surface improved lower trunk muscle adjustment, increasing the stability of the pelvis and affecting the mobility of the upper trunk and distal lower extremities, thereby improving the balance. Therefore, an unstable support surface provides a superior environment for the trunk muscles and improving balance ability.[22]

- **Xibo Sun, et al., 2016** conducted a prospective study to compare the effect of core stability exercises and conventional exercises on 40 patients with hemiplegia were recruited and randomly divided into either an experimental or control group. Patients in the control group performed conventional exercises for six weeks and those in the experiment group performed core stability exercises for six weeks. Modified Barthel Index and Berg Balance Scale were used to evaluate and compare between the both groups. Consequently, the outcomes of the study can be demonstrated that core stability exercises present with better effectiveness than conventional exercises.[23]

- **Rajrupinder Kaur Rai, et al., 2014** conducted a randomized controlled trial study "Efficacy of Trunk Rehabilitation and Balance Training on Trunk Control, Balance and Gait among 30 stroke patients". They equally divided into Group A (Experimental) received trunk rehabilitation, balance training and conventional physiotherapy and Group B (Control) received conventional physiotherapy only for 4 days a week for 5 weeks assessed by Trunk Impairment Scale, Berg Balance Scale and 10 meters distance walk test. The results of study supported the importance of trunk rehabilitation exercises and balance training in addition to a conventional stroke rehabilitation program is beneficial in improving the trunk control, balance and gait parameters in Post Stroke Hemiplegic Patients.[24]

CHAPTER-III

MATERIALS AND METHODOLOGY

3.1 MATERIALS

- Suspension therapy
    - Suspension couch
    - Hooks
    - Ropes
    - Slings
- Wedge
- Knee hammer
- Goniometry
- Inch tape
- Stop watch

3.2 STUDY DESIGN

PROSPECTIVE QUASI EXPERIMENTAL STUDY DESIGN

(Pre-test and post-test design with treatment comparison)

A Prospective Quasi Experimental Study Design was adopted for the study. With the help of this study design, the pre-test and post-test values were assessed for Group-A & Group- B.

In the current study, the pre-test measurement of trunk impairment scale and berg balance scale were measured before the introduction of the one legged with hip abduction bridging (for Group-A) or one legged without hip abduction bridging (for Group-B)**.** The post-test trunk impairment scale and berg balance scale were measured after the introduction of the one legged bridging.

3.3 STUDY SETTING

Department of Neurology and Department of Physical medicine and rehabilitation,

PSG hospitals, Coimbatore.

3.4 STUDY DURATION

Duration of 8 months was adopted for this study.

3.5 HUMAN PARTICIPATION PROTECTION

The study was reviewed and approved by institutional human ethics committee at PSG IMSR.

3.6 POPULATION /PARTICIPANTS

In-patients presented with post stroke referred to stroke rehabilitation centre from the Department of Neurology and Physical Medicine and Rehabilitation, PSG hospitals, Coimbatore were chosen as population for this study. A total of 12 patients were assigned into 2 groups.

Group-A: 6 patients received one legged bridging with hip abduction and conventional physiotherapy.

Group-B: 6 patients received one legged bridging without hip abduction and conventional physiotherapy.

3.7 SAMPLING

- Convenience sampling method

3.8 TREATMENT DURATION

Group-A- 10 repetitions per set for 3 sets, 1 session per day (6 sessions per week) continued for 2 weeks (40 minutes) (Annexure V)

Group-B- 10 repetitions per set for 3 sets, 1 session per day (6 sessions per week) continued for 2 weeks (40 minutes) (Annexure V)

3.9 CRITERIA FOR SAMPLE SELECTION

3.9.1 Inclusion Criteria

- Post stroke patients with 40 – 65 years of age.
- Post stroke less than 1 month.
- First onset of right and left MCA hemispheric stroke.
- Mini mental state examination score of 23 or above.
- Patient should be able to follow the commands.
- Medically stable patients.
- Patient who gives informed consent to participate in the study.

3.9.2 Exclusion Criteria

- Visual field defect.
- Symptomatic cardiac failure.
- Recurrent stroke.
- Non cooperative patients.
- Patients with other neurological disorder and musculoskeletal conditions.

3.10 INSTRUMENTATION & TOOLS FOR DATA COLLECTION

- Trunk impairment scale (Annexure – IV)
- Berg balance scale (Annexure – IV)

3.11 TECHNIQUE OF DATA COLLECTION

- In Group-A - one legged bridging with hip abduction group of trunk stability and balance were measured before and after the treatment session.
- In Group-B - one legged bridging without hip abduction group of trunk stability and balance were measured before and after the treatment session.
- Trunk stability was measured by using Trunk impairment scale.
- Balance was measured by using Berg balance scale.

3.12 TECHNIQUE OF DATA ANALYSIS & INTERPRETATION

Data collected from subjects were analyzed using Paired‘t’ test to measure the changes between pre-test and post -test values of the group. Comparison between the groups were measured through outcomes using independent‘t’ test. All these statistical analysis were done by using **SPSS 16.0 version**.

CHAPTER-IV

STATISTICAL ANALAYSIS AND INTERPRETATION

Data analysis is the systemic organization and synthesis of research data and testing of research hypothesis using these data. Interpretation is the process of making sense of the results of a study and examining the implication (Polit & Belt, 2004).

A total of 12 patients were selected by convenience sampling method.

6 Participants were randomly selected and assigned to Group-A & Group-B. Group-A received one legged bridging with hip abduction and Group-B received one legged bridging without hip abduction.

The pre-test and post-test values were taken for interpretation of trunk stability and balance with the trunk impairment scale and berg balance scale respectively.

The mean, standard deviation and Paired‘t’ test values were used to find out whether there is any significant difference between pre-test and post-test values within the group.

Independent‘t’ test, mean difference values for trunk impairment scale and berg balance scale of Group-A and Group-B were used to find out whether there is any significant difference between the groups. All these statistical analysis was done by using **SPSS 16.0 version (SPSS Statistical package, 2007, Chicago, IL.)**

Paired 't' test

$$SD = \sqrt{\frac{\sum (d - \overline{d})^2}{n-1}}$$

$$t = \frac{\overline{d}\sqrt{n}}{SD}$$

$\overline{d}$ = Calculated Mean Difference of pretest & post test values

SD = Standard Deviation

n = Number of samples

d = Difference b/w pretest & post test values

Independent 't' test:

$$t = \frac{|\bar{x}_1 - \bar{x}_2|}{SD\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where,

$$SD = \sqrt{\frac{(n_1 - 1)SD_1^2 + (n_2 - 1)SD_2^2}{(n_1 + n_2) - 2}}$$

$\overline{X_1}$ = Mean difference in Group A

$\overline{X_2}$ = Mean difference in Group B

SD = Combined standard deviation of Group A and Group B

n_1 = Number of patients in Group A

n_2 = Number of patients in Group B

SD_1 = Standard Deviation of Group A

SD_2 = Standard Deviation of Group B

SCHEMATIC REPRESENTATION OF FLOW OF PARTICIPANTS

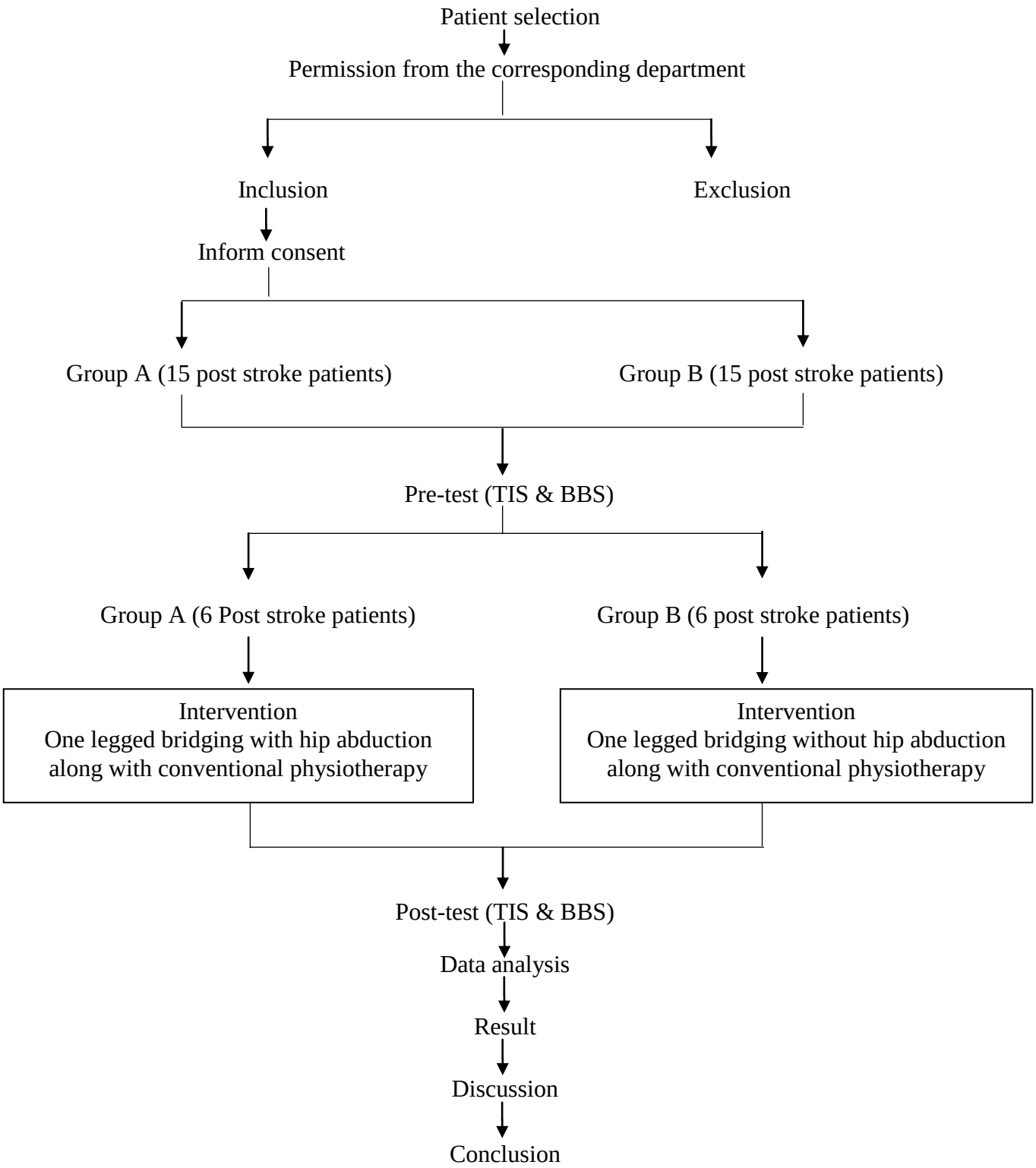

TABLE 1

PRE TEST AND POST TEST VALUES OF TIS IN GROUP A (n=6)

S NO.	TIS SCORE PRE TEST	TIS SCORE POST TEST
1.	2	7
2.	2	6
3.	0	5
4.	2	9
5.	0	7
6.	2	7

TABLE- 2

PRE TEST AND POST TEST VALUES OF TIS IN GROUP B (n=6)

S NO.	TIS SCORE PRE TEST	TIS SCORE POST TEST
1.	2	5
2.	0	2
3.	2	4
4.	2	2
5.	2	4
6.	0	2

FIGURE-1

PRETEST AND POSTTEST VALUES OF TRUNK IMPAIRMENT SCALE OF GROUP A

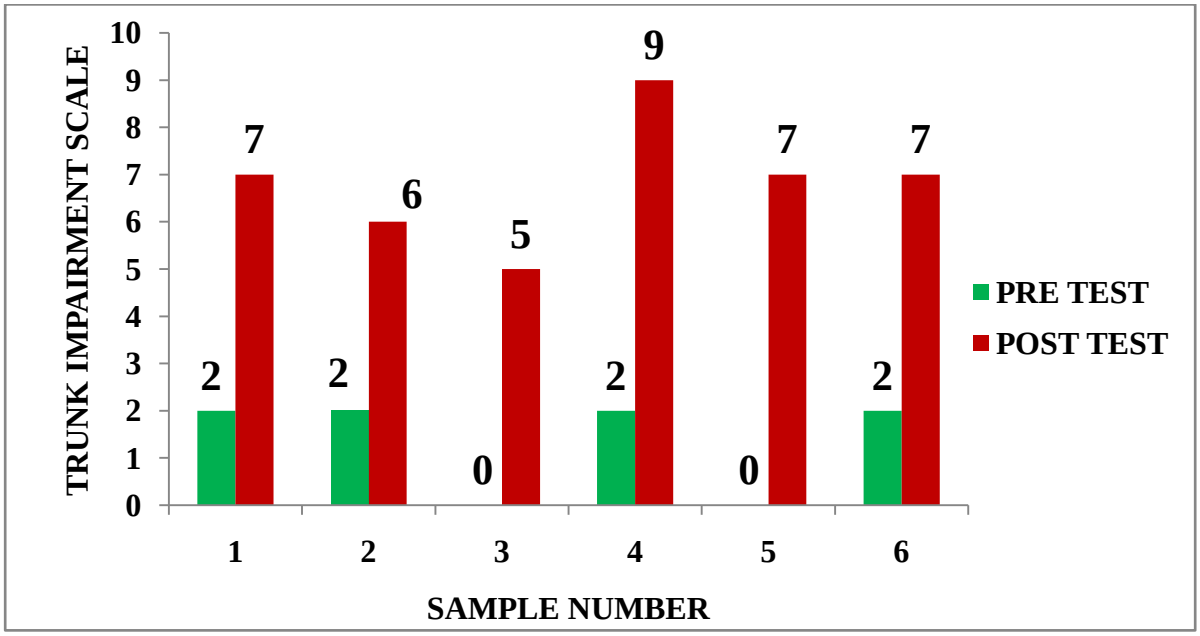

FIGURE-2

PRETEST AND POST TEST VALUES OF TRUNK IMPAIREMENT SCALE OF GROUP B

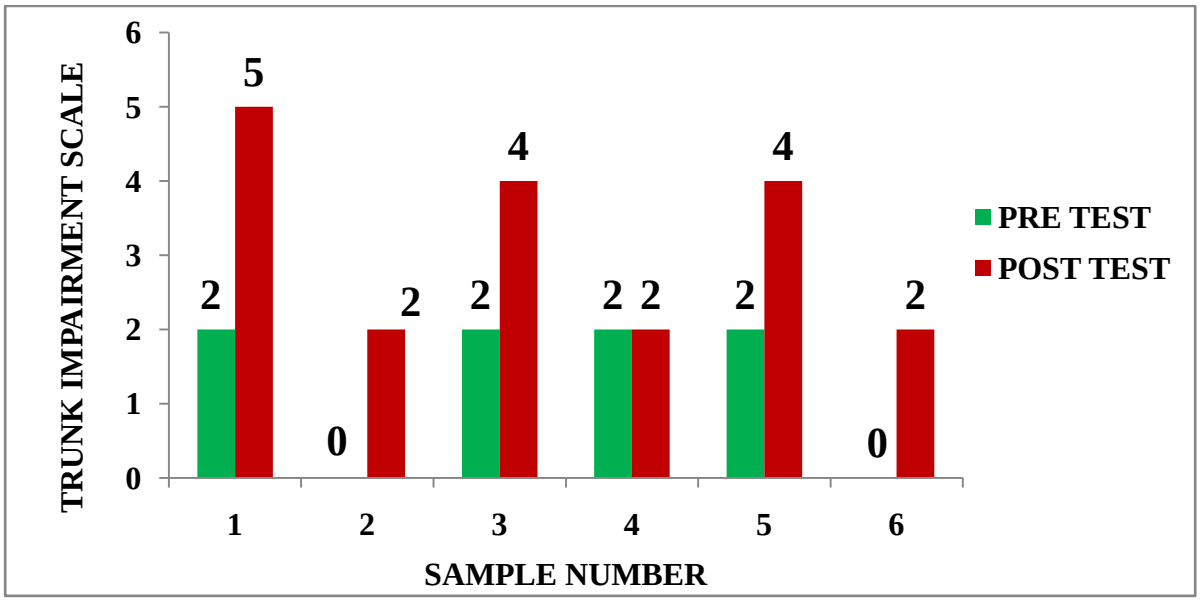

TABLE 3

PRE TEST AND POST TEST VALUES OF BBS IN GROUP A (n=6)

S NO.	BBS SCORE PRE TEST	BBS SCORE POST TEST
1.	1	3
2.	1	2
3.	0	1
4.	1	3
5.	0	2
6.	1	3

TABLE-4

PRE TEST AND POST TEST VALUES OF BBS IN GROUP B (n=6)

S NO.	BBS SCORE PRE TEST	BBS SCORE POST TEST
1.	1	2
2.	0	1
3.	0	2
4.	1	2
5.	1	2
6.	0	1

FIGURE-3

PRETEST AND POSTTEST VALUES OF BERG BALANCE SCALE OF GROUP A

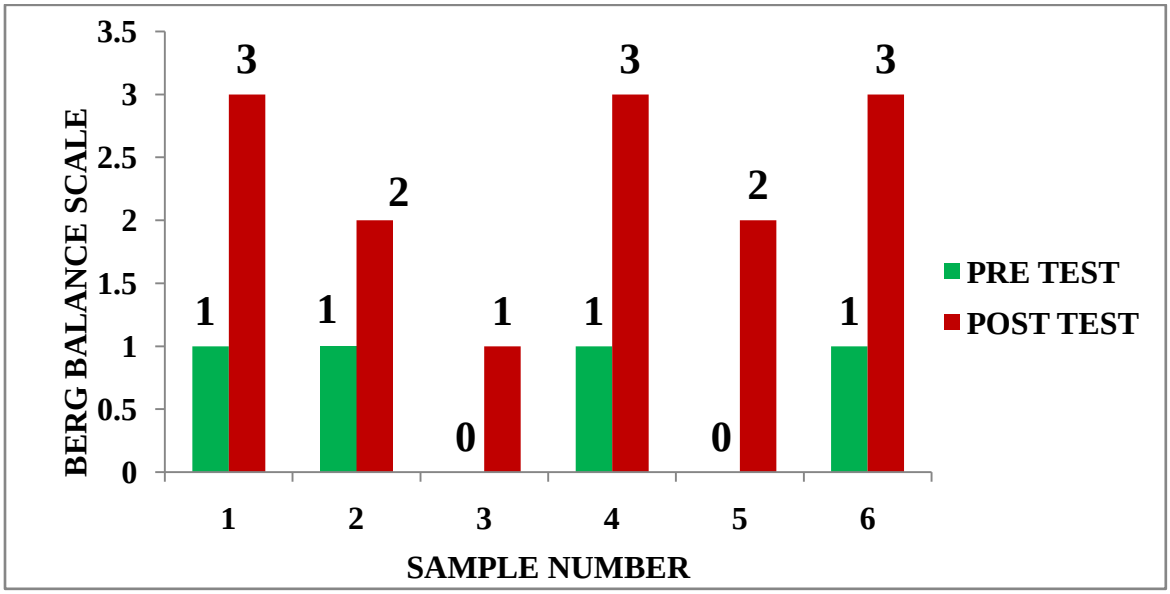

FIGURE-4

PRETEST AND POSTTEST VALUES OF BERG BALANCE SCALE OF GROUP B

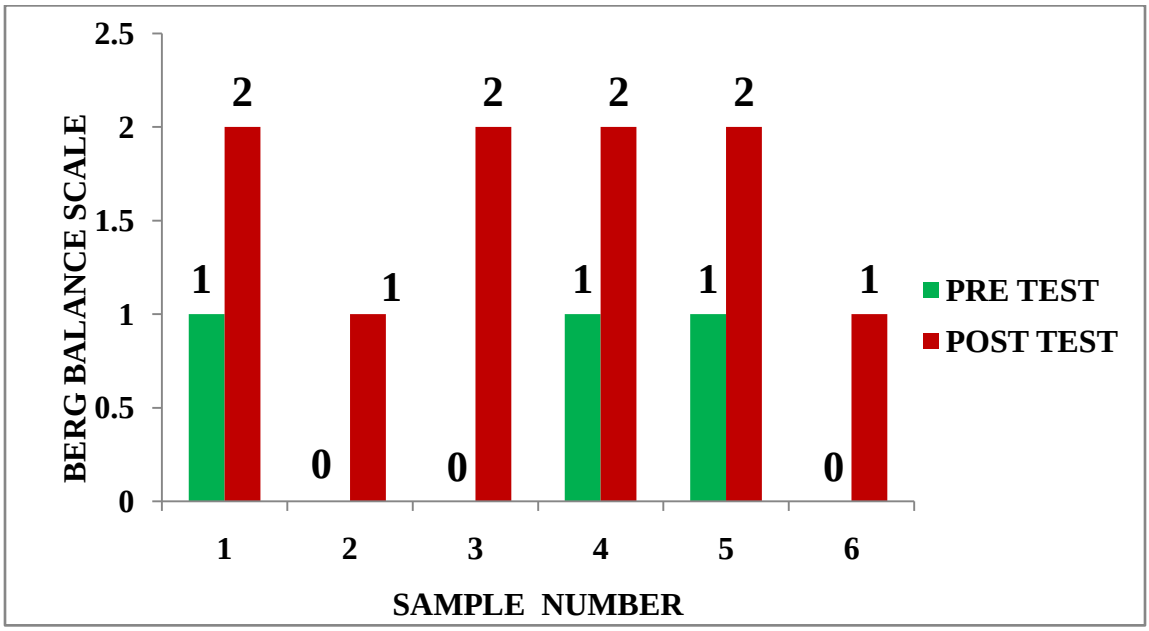

TABLE-5

PAIRED 't' TEST VALUES OF TRUNK IMPAIRMENT SCALE
GROUP A & GROUP B
(n=12)

Groups	Mean	Mean Difference	Standard Deviation	't' Value	'p' Value
Group A					
Pre-test	1.333	5.500	1.224	11.000	$p<0.05$
Post-test	6.833				
Group B					
Pre-test	1.333	1.833	0.983	4.568	$p<0.05$
Post-test	3.166				

Based on Table-5, the mean difference of Group-A was found to be 5.500, Standard deviation was 1.224, the 't' value using the paired 't' test was 11.000 which was greater than the table value of 2.571 at $p<0.05$. In Group-B the mean difference was 1.833, Standard deviation was 0.983, the 't' value using the paired 't' test was 4.568 which was greater than the table value of 2.571 at $p<0.05$. This shows there is a significant improvement in trunk stability in both groups. The result shows that pre-test and post-test mean difference of trunk stability of Group-A is statistically significant than Group-B.

FIGURE-5

PRE TEST AND POST TEST MEAN VALUES FOR TIS & BBS OF GROUP A

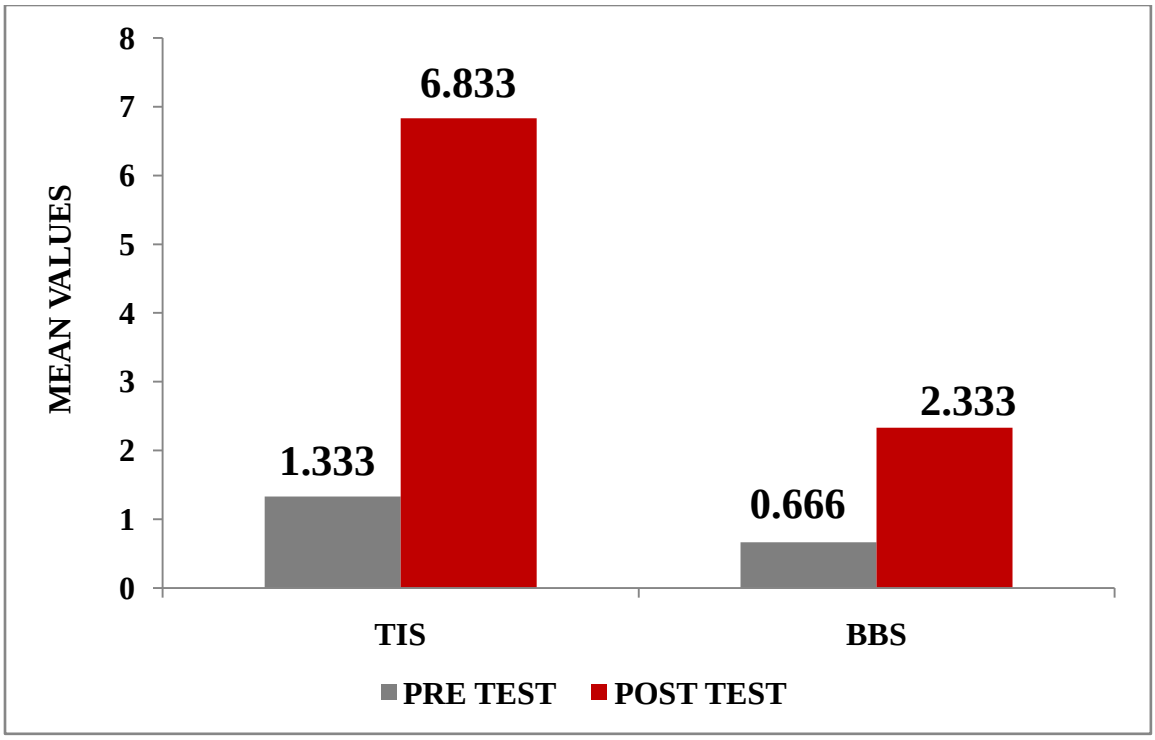

TABLE-6

PAIRED 't' TEST VALUES OF BERG BALANCE SCALE
GROUP A & GROUP B
(n=12)

Groups	Mean	Mean Difference	Standard Deviation	't' Value	'p' Value
Group A					
Pre-test	0.666	1.666	0.516	7.906	$p<0.05$
Post-test	2.333				
Group B					
Pre-test	0.500	1.166	0.408	7.000	$p<0.05$
Post-test	1.666				

Based on Table-6, the mean difference of Group-A was found to be 1.666, Standard deviation was 0.516, the 't' value using the paired 't' test was 7.906 which was greater than the table value of 2.517 at $p<0.05$. In Group-B the mean difference was 1.166, Standard deviation was 0.408, the 't' value using the paired 't' test was 7.000 which was greater than the table value of 2.517 at $p<0.05$. This shows there is a significant improvement in balance in both groups. The result shows that pre-test and post-test mean difference of berg balance scale of Group-A is statistically significant than Group-B.

FIGURE-6

PRE TEST AND POST TEST MEAN VALUES FOR TIS & BBS OF GROUP B

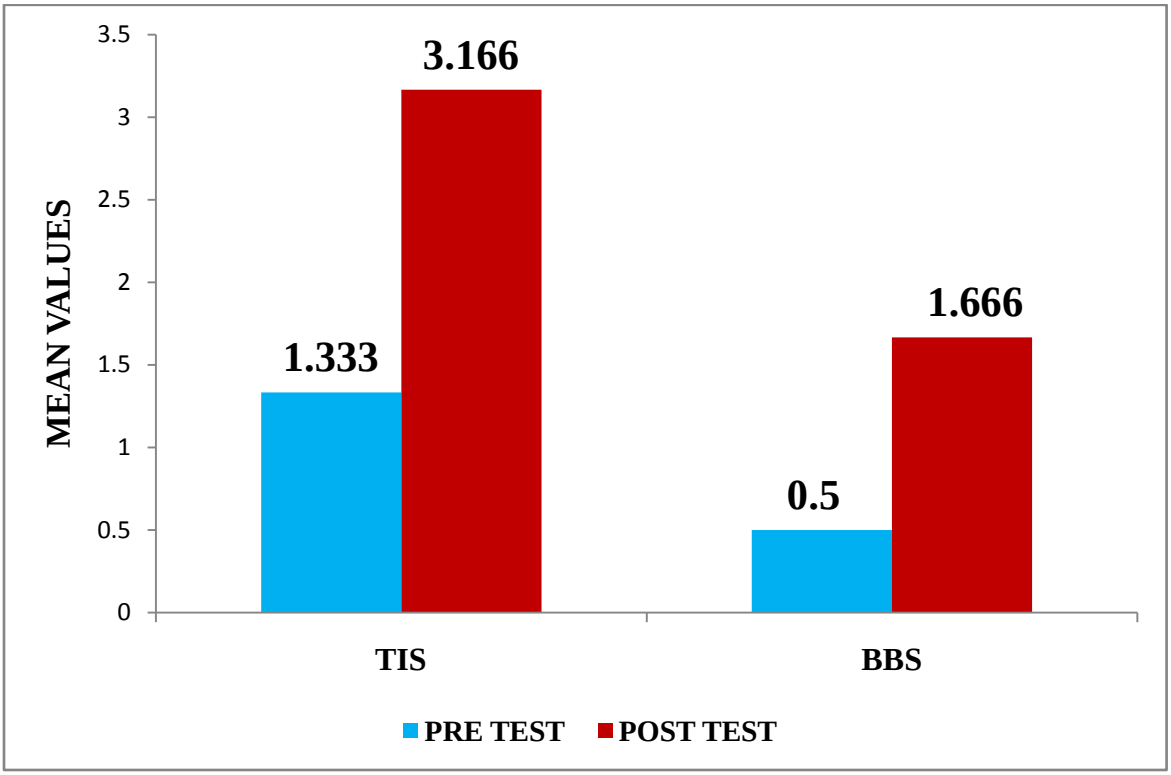

FIGURE-7

MEAN DIFFERENCE VALUES FOR TIS AND BBS OF GROUP A & GROUP B

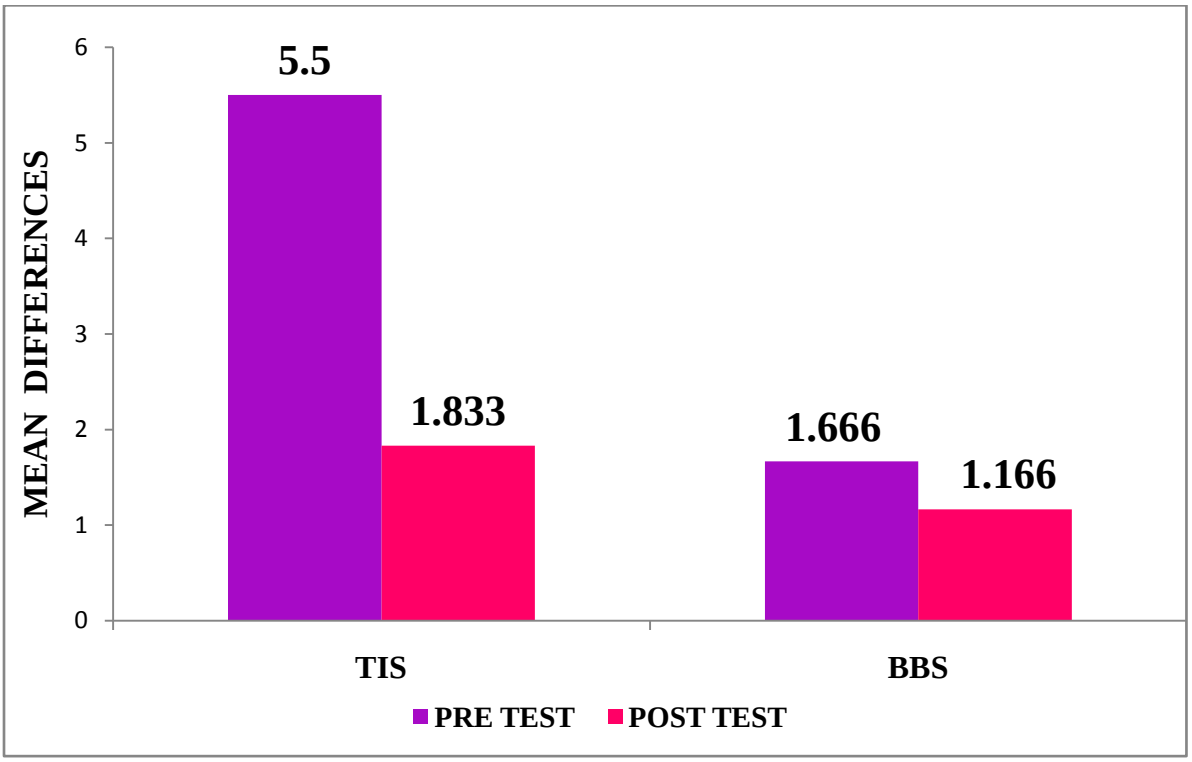

TABLE-7

INDEPENDENT 't' TEST VALUES OF GROUP A & GROUP B

Outcome Measures	Mean Difference	Standard Deviation	't' value	'p' value
TIS	3.667	1.77	4.778	$p<0.05$
BBS	0.667	0.47	1.690	$p>0.05$

The independent't' test was performed between Group-A and Group-B to analyze the significance of one legged bridging with and without hip abduction on improving trunk stability and balance for post stroke patients.

For **TIS**, between the groups the calculated't' value was 4.778 which was greater than the table value of 2.228 at $p<0.05$. For **BBS**, between the groups the calculated't' value was 1.690 which was lesser than the table value of 2.228 at $p>0.05$. Therefore the statistical analysis shows that one legged bridging with hip abduction is effective than one legged bridging without hip abduction on improving the trunk stability and not in balance for post stroke patients.

CHAPTER-V

RESULTS AND DISCUSSION

All participants in Group-A and Group-B showed significant improvement in trunk impairment scale with a mean difference of 5.500 and 1.833, standard deviation of 1.224 and 0.983 respectively. The calculated 't' value using the paired 't' test for Group-A and Group-B were 11.000 and 4.568 respectively, which was greater than the table value of 2.571; $p<0.05$.

In Berg balance scale Group-A and Group-B showed significant improvement with a mean difference of 1.666 and 1.166, standard deviation of 0.516 and 0.408 respectively. The calculated 't' value using the paired 't' test for Group-A and Group-B were 7.906 and 7.000 respectively, which was greater than the table value of 2.571; $p<0.05$.

When comparing between the groups using independent't' test, the trunk impairment scale showed mean difference of 3.667, standard deviation of 1.77 and't' value of 4.778 which was greater than the table value of 2.228; $p<0.05$ and Berg balance scale showed mean difference of 0.667, standard deviation of 0.47 and't' value of 1.690 which was lesser than the table value of 2.228; $p>0.05$

From the above data it is clearly understood that one legged bridging with hip abduction is much more effective and beneficial than one legged bridging without hip abduction using a sling on contralateral side only in trunk stability in patients with hemiplegic.

Twelve numbers of hemiplegic post stroke participants from In-Patient Department of Neurology and Physical Medicine and Rehabilitation referred to Stroke Rehabilitation Centre were recruited in this study.

Even though the various studies of bridging exercises have been shown to improve the trunk stability and balance after a long term Rehabilitation, to our knowledge evidence on short term i.e. for 2 weeks (12 days), effects of with and without hip abduction bridging in relation to trunk stability improves and functional balance is not clear. This leads a major route of idea in implementing this study.

In the present study, the improvement in trunk stability may be due to the recruitment of the trunk muscles thereby that improves the strength as well as for the hip extensor muscles by pelvic position i.e. Gluteus & Hamstrings. Gluteus maximus and the hamstrings work together to extend the trunk from a flexed position by pulling the pelvis backwards or posteriorly.[25]. Gluteus maximus plays an important role in stabilizing the pelvis during upright activities.

Gluteus maximus is conversely greater in hip external rotation that represented a shift in the involvement of the lumbar extensors to the Gluteus Maximus as a result of hip external rotation, which is known to activate the Gluteus Maximus to a greater extent than either in neutral or internally rotated hip positions. Presence of multiple different regions within the gluteus maximus that have different characteristics seems to imply that training and a range of different hip actions through hip extension, hip external rotation and hip abduction as well as different repetition ranges may be valuable for maximum development. [26, 27]

Superior fibers of the gluteus maximus can extend the knee through its attachment to the iliotibial tract.[25] Hip flexion angle affected the activity of the Gluteus Maximus and Tensor Fascia Lata during isometric contraction in abduction.[28] Gluteus maximus works to offload the ischial tuberosities when supporting the body weight in sitting by a static of dynamic contraction. Gluteus maximus can be trained to produce functional knee extension when quadriceps femoris is weak or paralysed.[30]. Because a dominant quadriceps femoris causes poor endurance and delayed firing of the gluteus maximus muscle on lower extremity instability[33].

Sun young kung, sung Dae choung (2015) suggested that when the angle of hip abduction is greater, Gluteus maximus muscle activity increases, Erector spinae muscle activity decreases and Anterior pelvic tilt reduced. Gluteus Maximus muscle in a more abducted position is that it may position the pelvis more posteriorly as well as concurrently decreases the anterior pelvic tilt angle. Therefore, 30^{o} of hip abduction can be implemented as an effective method to facilitate Gluteus Maximus muscle activity that minimizes the compensatory Erector Spinae muscle activity and decreases the anterior pelvic tilt.

Sang yeol lee (2012), Daehee Lee (2015), Eun-Mi Jang (2013) presented that the activation of the abdominal muscles is critical for stabilizing the pelvis against pulling force of the hip muscles. When the pelvic muscles are stable, forces on the trunk are transmitted to the hip joint and lower extremities. Muscle activation is seen in transverse abdominis, external oblique and adducto magnus during adduction and in rectus abdominis and gluteus medius during abduction bridging. During adduction bridging, contraction of the adductors i.e. adductor magnus muscle is also activated the powerful hip extensors.Adductor magnus is responsible not only for hip joint adduction, but also for medial rotation, which reduces the intra-pelvic space; this reduction adjusts the joint locations, providing an advantageous environment for abdominal muscle contraction. Therefore, Hip adductor contraction appears to contribute the abdominal muscle activity. This contraction of hip adductor synergistically facilitates the contraction of pelvic and abdominal muscles, reinforcing the trunk muscles and contributing to stability. During abduction bridging, gluteus medius contributes to pelvic stability due to recruitment of the lower half of the rectus abdominis and gluteus in their actions that are correcting the pelvic tilt which is required for improving stability.

According to **Kyuju Cho, Jongwoo Bak (2016)** reported that raising one lower extremity reduces the base of support, and therefore, there is an increase in trunk muscle activation to compensate for the instability. Thus, the length of the lever arm is important in optimizing the muscle activation. If the length of the lever arm increases, the mechanical and power demand on the related muscles increase. In this study, it is considered that the increase in muscle activation that occurred during the bridge with hip abduction condition compared to the general bridge condition was due to an increase in the lever arm by that it may increase the Erector Spinae and External Oblique muscle activation was observed during the one-legged bridge with sling and one-legged bridge with hip abduction condition compared to the general bridge condition, and an increase in the contralateral Gluteus Maximus and Biceps Femoris muscle activation compared to the ipsilateral side.

In summary, the present study suggests that one legged bridging with and without hip abduction may have unique effect in improving the trunk stability in post stroke patients.

5.1 LIMITATIONS

- Study confined to a small sample size and convenience sampling.
- Inclusion of this study is done only among MCA hemispheric stroke.
- We could not monitor the Long term effects of the intervention.
- Outcomes such as EMG and stress gauge sensor are not used in order to find out a muscular activity and recovery of motor performance in trunk.

5.2 RECOMMENDATIONS FOR THE FUTURE STUDY

- Randomized control trail to a large number of sample size.
- Shoulder level and range can also be considered and measured for intervention effect.
- Long term effects of intervention for the balance are needed for the future study.

CHAPTER-VI

SUMMARY AND CONCLUSION

This study was conducted to compare the efficacy of one legged bridging with and without hip abduction on trunk stability and balance in post stroke patients. Thus the statistical analysis of data concluded that

“There was statistically significant improvement on trunk stability along with conventional physiotherapy for post stroke patients following one legged bridging with hip abduction than one legged bridging without hip abduction.”

“There was no statistically significant improvement in balance along with conventional physiotherapy between the groups, and both the groups showed significant improvement in balance for post stroke patients following one legged bridging with hip abduction than one legged bridging without hip abduction.”

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ANNEXURE I

PSG Institute of Medical Sciences & Research
Institutional Human Ethics Committee
Recognized by The Strategic Initiative for Developing Capacity in Ethical Review (SIDCER)
POST BOX NO. 1674, PEELAMEDU, COIMBATORE 641 004, TAMIL NADU, INDIA
Phone : 91 422 - 2598822, 2570170, Fax : 91 422 - 2594400, Email : ihec@psgimsr.ac.in

To
Ms S Varuni
II Year MPT
Guides: Mr R Mahesh / Mrs P Sweety Subha
PSG College of Physiotherapy
Coimbatore

Ref: Project No.17/148

Date: November 3, 2017

Dear Ms Varuni,

Institutional Human Ethics Committee, PSG IMS&R reviewed and discussed your application dated 24.04.2017 to conduct the research study entitled "*Comparing the efficacy of one legged bridging with and without hip abduction using a sling on contralateral side on trunk stability and balance in post-stroke patients*" during the IHEC meeting held on 19.05.2017.

The following documents were reviewed and approved:

1. Project submission form
2. Study protocol (Version 2 dated 27.10.2017)
3. Informed consent forms (Version 2 dated 01.09.2017)
4. Data Collection Tool (Version 2 dated 16.08.2017)
5. Permission letter from concerned Heads of Department
6. Current CVs of Principal investigator, Co-investigator
7. Budget

The following members of the Institutional Human Ethics Committee (IHEC) were present at the meeting held on 19.05.2017 at IHEC Secretariat, PSG IMS & R between 10.00 am and 11.00 am:

Sl. No.	Name of the Member of IHEC	Qualification	Area of Expertise	Gender	Affiliation to the Institution Yes/No	Present at the meeting Yes/No
1	Mr R Nandakumar (Chairperson, IHEC)	BA., BL	Legal Expert	Male	No	Yes
2	Dr. S. Bhuvaneshwari (Member-Secretary, IHEC)	MD	Clinical Pharmacology	Female	Yes	Yes
3	Dr S Shanthakumari	MD	Pathology, Ethicist	Female	Yes	Yes
4	Dr Sudha Ramalingam	MD	Epidemiologist, Ethicist Alt. member-Secretary	Female	Yes	Yes
5	Dr D Vijaya	M Sc., Ph D	Basic Medical Sciences (Biochemistry)	Female	Yes	Yes

The study is approved in its presented form. The decision was arrived at through consensus. Neither PI nor any of proposed study team members were present during the decision making of the IHEC. The IHEC functions in accordance with the ICH-GCP/ICMR/Schedule Y guidelines. The approval is valid until one year from the date of sanction. You may make a written request for renewal / extension of the validity, along with the submission of status report as decided by the IHEC.

PSG Institute of Medical Sciences & Research
Institutional Human Ethics Committee

Recognized by The Strategic Initiative for Developing Capacity in Ethical Review (SIDCER)
POST BOX NO. 1674, PEELAMEDU, COIMBATORE 641 004, TAMIL NADU, INDIA
Phone : 91 422 - 2598822, 2570170, Fax : 91 422 - 2594400, Email : ihec@psgimsr.ac.in

Following points must be noted:

1. IHEC should be informed of the date of initiation of the study
2. Status report of the study should be submitted to the IHEC every 12 months
3. PI and other investigators should co-operate fully with IHEC, who will monitor the trial from time to time
4. At the time of PI's retirement/intention to leave the institute, study responsibility should be transferred to a colleague after obtaining clearance from HOD, Status report, including accounts details should be submitted to IHEC and extramural sponsors
5. In case of any new information or any SAE, which could affect any study, must be informed to IHEC and sponsors. The PI should report SAEs occurred for IHEC approved studies within 7 days of the occurrence of the SAE. If the SAE is 'Death', the IHEC Secretariat will receive the SAE reporting form within 24 hours of the occurrence
6. In the event of any protocol amendments, IHEC must be informed and the amendments should be highlighted in clear terms as follows:
   a. The exact alteration/amendment should be specified and indicated where the amendment occurred in the original project. (Page no. Clause no. etc.)
   b. Alteration in the budgetary status should be clearly indicated and the revised budget form should be submitted
   c. If the amendments require a change in the consent form, the copy of revised Consent Form should be submitted to Ethics Committee for approval
   d. If the amendment demands a re-look at the toxicity or side effects to patients, the same should be documented
   e. If there are any amendments in the trial design, these must be incorporated in the protocol, and other study documents. These revised documents should be submitted for approval of the IHEC and only then can they be implemented
   f. Any deviation-Violation/waiver in the protocol must be informed to the IHEC within the stipulated period for review
7. Final report along with summary of findings and presentations/publications if any on closure of the study should be submitted to IHEC

Kindly note this approval is subject to ratification in the forthcoming full board review meeting of the IHEC.

Thanking You,

Yours Sincerely,

03/11/2017

SECRETARY
PSG IMS&R
COIMBATORE-641004.
INSTITUTIONAL HUMAN ETHICS COMMITTEE

Dr D Vijaya
Member - Secretary
Institutional Human Ethics Committee

ANNEXURE II

NEUROLOGICAL PHYSIOTHERAPY ASSESSMENT FORM

I. SUBJECTIVE ASSESSMENT

Name: Age: Gender: M/F IP/OP Number:

Occupation: Handedness: R/L Referred by:

Address: Sample number: Group name:

Chief Complaints:

Present medical history:

Past Medical History:

Personal History:

Family History:

Socioeconomic History:

Symptoms History:

Side: Site:

Onset: Duration:

Type: Severity:

Aggravating Factors: Relieving Factors:

Vital Signs:

Temperature:		**Heart Rate:**	
Blood Pressure:		**Respiratory Rate:**	

II. OBJECTIVE EXAMINATION

a) ON OBSERVATION:

Attitude of limbs:

Built:

Posture:

Gait:

Pattern of Movement:

Edema:

Pressure sore:

Muscle Wasting:

Deformity:

Wounds:

External Appliances:

b) ON PALPATION

Warmth:

Tenderness:

Tone:

Swelling:

c) ON EXAMINATION

HIGHER MENTAL FUNCTIONS

Level of Consciousness:

Orientation:

Person:

Place:

Time:

Memory:

Immediate:

Recent:

Remote:

Verbal:

Visual:

Communication:

Cognition:

Fund of Knowledge:

Calculation:

Proverb Interpretation:

Attention:

Emotional Status:

Perception:

Body Scheme / Body Imaging:

Spatial relation disorders:

Agnosias / Apraxias:

Special Senses:

Cranial Nerves:

Nerves	**Comments**	**Nerves**	**Comments**
I – Olfactory		VII – Facial	
II – Optic		VIII- VestibuloCochlear	
III – Oculomotor		IX – Glossopharyngeal	
IV – Trochlear		X – Vagus	
V – Trigeminal		XI – Accessory	
VI – Abducent		XII – Hypoglossal	

SENSORY SYSTEM:

Location	Upper Extremity		Lower Extremity		Trunk		Comments
Sensation	Rt.	Lt	Rt.	Lt.	Rt.	Lt.	
Superficial							
Pain							
Temperature							
Touch							
Pressure							
Deep							
Movement Sense							
Position Sense							
Vibration							
Cortical							
Tactile Localization							
2 point discrimination							
Stereognosis							
Barognosis							
Graphesthesia							
Texture Recognition							
Double Simultaneous Stimulation							

MOTOR SYSTEM:

Muscle Girth:

Area	**Rt.(cm.)**	**Lt.(cm.)**
Arm		
Forearm		
Thigh		
Calf		

Voluntary Control:

Side	**Rt.**	**Lt.**
Upper Limb		
Lower Limb		

Limb Length:

Side	Rt.(cm.)	Lt.(cm.)
True		
Apparent		

Muscle Tone:

Muscles	Rt.	Lt.
Shoulder		
Flexors		
Extensors		
Abductors		
Adductors		
External Rotators		
Internal Rotators		
Elbow		
Flexors		
Extensors		
Forearm		
Pronators		
Supinators		
Wrist		
Flexors		
Extensors		
Radial Deviators		
Ulnar Deviators		
Hand		
Intrinsics		
Extrinsics		

Muscles	Rt.	Lt.
Hip		
Flexors		
Extensors		
Abductors		
Adductors		
External Rotators		
Internal Rotators		
Knee		
Flexors		
Extensors		
Ankle		
Dorsiflexors		
Plantarflexors		
Foot		
Invertors		
Evertors		
Intrinsics		
Extrinsics		

Muscle Power:

Muscles	Rt.	Lt.
Shoulder		
Flexors		
Extensors		
Abductors		
Adductors		
External Rotators		
Internal Rotators		
Elbow		
Flexors		
Extensors		
Forearm		
Pronators		
Supinators		
Wrist		
Flexors		
Extensors		
Radial Deviators		
Ulnar Deviators		
Hand		
Intrinsics		
Extrinsics		

Muscles	Rt.	Lt.
Hip		
Flexors		
Extensors		
Abductors		
Adductors		
External Rotators		
Internal Rotators		
Knee		
Flexors		
Extensors		
Ankle		
Dorsiflexors		
Plantarflexors		
Foot		
Invertors		
Evertors		
Intrinsics		
Extrinsics		

Trunk Flexors		
Trunk Extensors		
Trunk Side Flexors		
Trunk Rotators		

Reflexes:

	Reflex	Right	Left
Superficial	Abdominal		
	Plantar		
Deep	Biceps		
	Brachioradialis		
	Triceps		
	Knee		
	Ankle		

Pathological:

Coordination:

Non Equilibrium Tests	Rt.	Lt.
Finger to nose		
Finger opposition		
Mass Grasp		
Pronation /Supination		
Rebound test		
Tapping (Hand)		
Tapping (Foot)		
Heel to knee		
Drawing a circle(Hand)		
Drawing a circle(Foot)		

Equilibrium tests	Grade
Standing: Normal Posture	
Standing: Normal Posture with vision occluded	
Standing: Feet together	
Standing on one foot	
Standing: Lateral trunk flexion	
Tandem walking	
Walk: Sideways	
Walk: Backward	
Walk in a circle	
Walk on heels	
Walk on toes	

Involuntary Movements:

TRUNK IMPAIRMENT SCALE SCORE:

Balance:

Sitting:

Standing:

Balance Reactions:

Posture:

Lying:

Sitting:

Standing:

Gait :

Step Length:

Stride Length:

Base width:

Cadence:

Biomechanical Deviations:

Hand Functions:

Reaching:

Grasping:

Releasing:

Assistive Devices

Investigation Findings:

Functional Status

BED MOBILITY:

TRANSFERS:

ADL:

Problem List:

Sl.	Impairment	Functional Limitation

Functional Diagnosis

Management

Goals:

Short term:

Long term:

Treatment:

ANNEXURE – III

PROFORMA

Patient Name:

Age: Inpatient number:

Sex: Outpatient number:

Occupation: Address:

Date of admission:

Date of 1st assessment:

Date of follow up:

Diagnosis:

Post stroke duration:

S.NO	Trunk impairment scale (TIS)		Berg balance scale (BBS)	
	Pre-test	Post-test	Pre-test	Post-test

Specific complaints:

Treatment:

THERAPIST SIGNATURE

ANNEXURE – IV

PSG Institute of Medical Science and Research, Coimbatore

Institutional Human Ethics Committee

INFORMED CONSENT FORMAT FOR RESEARCH PROJECTS

I Ms. Varuni. S, am carrying out a study on the topic: "**Comparing the efficacy of one legged bridging with and without hip abduction using a sling on contralateral side on trunk stability and balance in post stroke patients"**as a part of my research project being carried out under the aegis of the Department of Neurology, Physical medicine and Rehabilitation.

My research guide is: Prof. R. Mahesh, MPT (Cardio Respiratory)

Co-guide: Mrs. Sweety subha. P (Neurology)

The justification for this study is:

- Hemiplegia is a main symptom of stroke. This leads to decrease in trunk adjustment ability such as a tendency to fall towards the paretic side and qualitative degradation of gait. Sling exercise training could stimulate proprioceptors, nerve roots, and motor organs of the cerebrum and reactivate the muscles. Therefore, it could maximize the sense of balance & enhances the trunk stabilization.

The objective of this study:

- To compare the efficacy of one legged bridging with and without hip abduction using a sling on contralateral side on trunk stability and balance in post stroke patients.

Sample size: 30

Study volunteers / participants are Post stroke patients, 40-65 years of age.

Location: Department of Neurology and Department of PMR, PSG IMS&R Hospitals.

We request you to kindly cooperate with us in this study. We propose collect background information and other relevant details related to this study. We will be carrying out:

Initial interview: 15 minutes.

Data collected will be stored for a period of 5 years. We will not use the data as a part of another study.

Final interview: 15 minutes

If **photograph** is taken: **YES**, without revealing the identity of yours we want to publish in project book, conferences and journals.
Benefits from this study: The results of the study will influence the importance of performing the sling exercise training can improve the trunk stability and balance. Also helps for early mobilization with the proper gait pattern.

Risks involved by participating in this study: There are no possible risks or discomforts will be experienced during this study.

Clinical examination: **YES**

Blood sample collection: Specify quantity of blood being drawn: _____ ml**. NOT**

APPLICABLE

No. of times it will be collected: **_____. NOT APPLICABLE**

Whether blood sample collection is part of routine procedure or for research (Study) purpose:

1.Routine procedure 2.Research purpose **NOT APPLICABLE**

Specify **purpose**, discomfort likely to be felt and side effects, if any**:_____ NOT APPLICABLE**

Whether blood sample collected will be stored after study period : Yes / No , it will be destroyed **NOT APPLICABLE**

Whether blood sample collected will be sold: **Yes / No NOT APPLICABLE**

Whether blood sample collected will be shared with persons from another institution: Yes / No **NOT APPLICABLE**

Medication given , if any, duration, side effects, purpose, benefits**: NOT APPLICABLE**

Whether medication given is part of routine procedures : Yes / No (if not, state reasons for giving this particular medication) **NOT APPLICABLE**

How the **results** will be used: The data collected during the study will be used without revealing your identity. Your identity will be confidential even if the results of the study are published.

If you are uncomfortable in answering any of our questions during the course of the interview, **you have the right to withdraw from the interview / study at anytime.** You have the freedom to withdraw from the study at any point of time. Kindly be assured that your refusal to participate or withdrawal at any stage, if you so decide, will not result in any form of compromise or discrimination in the services offered nor would it attract any penalty. You will continue to have

access to the regular services offered to a patient. You will **NOT** be paid any remuneration for the time you spend with us for this interview / study. The information provided by you will be kept in strict confidence. Under no circumstances shall we reveal the identity of the respondent or their families to anyone. The information that we collect shall be used for approved research purposes only. You will be informed about any significant new findings - including adverse events, if any, – whether directly related to you or to other participants of this study, developed during the course of this research which may relate to your willingness to continue participation.

Consent: The above information regarding the study, has been read by me/ read to me, and has been explained to me by the investigator/s. Having understood the same, I hereby give my consent to them to interview me. I am affixing my signature / left thumb impression to indicate my consent and willingness to participate in this study (i.e., willingly abide by the project requirements).

Signature / Left thumb impression of the Study Volunteer / Legal Representative:

Signature of the Interviewer with date:

Witness:

Contact number of PI: 9543962077

Contact number of Ethics Committee Office: During office hours: 0422 2570170
Extn: 5818

After office hours: 9865561463

INFORMED CONSENT FORM

STATEMENT OF THE PARTICIPANTS:

I……have been explained in detail about the procedures to be carried out in the study.

I have been given opportunity to discuss and ask questions with the responsible Physiotherapist regarding the study.

I have understood that no harm to my _____ health by participating in this study.

I agree for my Consultant (neurologist) to be notified that I am taking part in the above study.

I agree to participate voluntarily in the study described in this form.

Name of Subject	Signature	Date
Name of Investigator	Signature	Date
Name of Witness	Signature	Date

பூ. சா. கோ மருத்துவக் கல்லூரி மற்றும் ஆராய்ச்சி நிறுவனம், கோவை

மனித நெறிமுறைக் குழு

ஒப்புதல் படிவம்

தேதி:

வருணி. சு, ஆகிய நான் பூ. சா. கோ மருத்துவக் கல்லூரியின் இயன்முறை மருத்துவத் துறையின் கீழ், **"பக்கவாத நோயாளிகளுக்கு உடல் பகுதி சமநிலை மற்றும் உடல் பகுதி உறுதித்தன்மையை மேம்படுத்த மறுபக்க காலில் கவண்** (Sling) **பயன்படுத்தி இடுப்பு கடத்தல்** (with Abduction) **அல்லது இடுப்பு கடத்தல் இல்லாமல்** (without Abduction) **பலனை ஒப்பிடுதல்"** என்ற தலைப்பில் ஆய்வு மேற்கொள்ள உள்ளேன்.

என் ஆய்வு வழிகாட்டி: திரு. ரா. மகேஷ், முதல்வர், பூ.சா.கோ பிஸியோதெரபி கல்லூரி, கோவை

திருமதி. ஸ்வீட்டி சுபா .ப, துணைப் பேராசிரியை

ஆய்வு மேற்கொள்வதற்கான அடிப்படை:

உடலில் ஒரு பக்கமாக செயலற்றுப் போவதன் அறிகுறி பக்கவாதமாகும். இதுபோன்ற பக்கவாதத்தால் ஒருபக்கமாக விழுதல் மற்றும் சீரான நடையின்மை உண்டாகும். கவண் பயன்படுத்தி உடற்பயிற்சிகள் செய்வதன் மூலம் அசைவுகளை உணர்தல், நரம்புப் பகுதிகள், தசைகளின் இயக்கம், பெருமூளையின் உறுப்புகளை இயக்கும் சக்தி ஆகியவற்றை பெறச் செய்யலாம். எனவே, இதை செய்வதன் மூலம் சமநிலை உணர்வு (Balance) மற்றும் உடல் பகுதி உறுதிப்படுத்துதலை (Trunk Stabilization) அதிகரிக்கலாம்.

ஆய்வின் நோக்கம்:

பக்கவாத நோயாளிகளுக்கு உடல் பகுதியின் சமநிலை மற்றும் உறுதித்தன்மையை மேம்படுத்த மறுபக்க காலில் கவண் பயன்படுத்தி இடுப்புக் கடத்தல் அல்லது இடுப்புக் கடத்தல் இல்லாமல் பலனை ஒப்பிடுவதாகும்.

ஆய்வில் பங்கு பெறும் நபர்களின் எண்ணிக்கை: 30

ஆய்வில் பங்கு பெறுவோர் மற்றும் வயது: 40 - 65 வயதுக்குட்ப்பட்ட, பக்கவாத நோயாளிகள்.

ஆய்வு மேற்கொள்ளும் இடம்: நரம்பியல் மற்றும் புனர்வாழ்வு மருத்துவ துறைகள், பூ.சா.கோ. மருத்துவமனை, கோயம்புத்தூர்.

இந்த ஆய்வில் எங்களுடன் ஒத்துழைக்குமாறு கேட்டுக்கொள்கிறோம். நாங்கள் சில தகவல்களை இந்த ஆய்விற்காக சேகரிக்க உள்ளோம்.

ஆய்வு செய்யப்படும் முறை:

இந்த ஆய்வின் மொத்த கால அளவு 8 மாதங்கள். முதல் கட்ட ஆய்வின் போது உடல் பகுதியின் உறுதித்தன்மை மற்றும் சமநிலை திறனை கண்டறிய உடல் பகுதி வலு அளவியின்(Trunk Impairment Scale) மூலம் அளவிடப்படும். பின்னர் இடுப்பு கடத்தல் அல்லது இடுப்பு கடத்தல் இல்லாமல் உடற்பயிற்சிகள் தினமும் ஒரு முறை வீதம் (ஒரு அமர்வுக்கு 40 நிமிடங்கள்) வாரம் ஐந்து நாட்களுக்கு, இரண்டு வாரத்திற்கு சிகிச்சை அளிக்கப்படும். இரண்டு வார முடிவில் எடுக்கப்படும் முடிவுகள் ஆரம்ப மதிப்பீட்டுடன் ஒப்பிடப்படும்.

முதன்மை நேர்காணல்: 15 நிமிடங்கள்

இந்த ஆய்வில் கிடைக்கும் தகவல்கள் **5 வருடங்கள்** பாதுகாக்கப்படும். இந்த தகவல்கள் வேறு ஆய்விற்குப் பயன்படுத்தப் பட மாட்டாது.

முடிவு நேர்காணல்: 15 நிமிடங்கள்

சுகாதாரக் கல்வி: அமர்வுகள்: ___ முறை ஒரு அமர்வுக்கான நேரம்: ___ நிமிடங்கள் **பொருந்தாது**

மருத்துவ பரிசோதனைகள்: உண்டு

இரத்த மாதிரி சேகரிப்பு: _____ மிலி _____ முறை **பொருந்தாது**

இரத்த மாதிரி எடுப்பது வழக்கமான சிகிச்சைக்காகவோ அல்லது இந்த ஆய்விற்காகவோ:

பொருந்தாது

இதனால் ஏற்படக் கூடிய அசௌகரியங்கள் / பக்க விளைவுகள்: இதனால் எந்த அசௌகரியமோ, பக்க விளைவுகளோ ஏற்படாது. **பொருந்தாது**

இரத்த மாதிரிகள் ஆய்விற்குப் பின் பாதுகாத்து வைக்கப்படுமா? ஆம் / இல்லை, அழிக்கப்படும்: **பொருந்தாது**

சேகரிக்கப்பட்ட இரத்தம் விற்கப்படுமா? ஆம் / இல்லை **பொருந்தாது**

சேகரிக்கப்பட்ட இரத்தம் வேறு நிறுவனத்துடன் பகிர்ந்து கொள்ளப்படுமா? ஆம் / இல்லை: **பொருந்தாது**

மருந்துகள் ஏதேனும் கொடுக்கப்படவிருந்தால் அவை பற்றிய விவரம் (கொடுக்கப்படும் காரணம், காலம், பக்க விளைவுகள், பயன்கள்): **பொருந்தாது**

மருந்துகள் கொடுக்கப்படுவது வழக்கமான சிகிச்சை முறையா?: ஆம் / இல்லை (இல்லை என்றால் கொடுக்கப்படும் காரணம்) **பொருந்தாது**

கொடுக்கப்படும் மருந்துகளுக்கு மாற்று உள்ளதா?: ஆம் / இல்லை (ஆம் என்றால் இந்த குறிப்பிட்ட

மருந்து கொடுக்கப்படும் காரணம்) **பொருந்தாது**

ஆய்வில் பங்குபெறுவதால் ஏற்படும் பலன்கள்:

கவண் உடற்பயிற்சி செய்வதன் மூலம் உடல் பகுதி உறுதித்தன்மை மற்றும் உடல் பகுதி சமநிலை அடையலாம். மேலும் சரியான நடைத்தன்மையை விரைவில் அடையவும் உதவுகிறது.

ஆய்வினால் ஏற்படக் கூடிய அசௌகரியங்கள் / பக்க விளைவுகள்: இதனால் எந்த அசௌகரியமோ, பக்க விளைவுகளோ ஏற்படாது

ஆய்வின் முடிவுகள் எந்த முறையில் பயன்படுத்தப்படும்?

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்கள் தங்களின் புகைப்படத்துடன் தங்களின் அடையாளம் அறியாவண்ணம் அகநிலை அறிக்கை (Internal report), கலந்தாய்வுகள் (Conference) அறிவியல் சார்ந்த ஆராய்ச்சிப் பத்திரிக்கைகளில் (Journals) வெளியிடப்படும். இதற்கு தங்களின் அனுமதி கோருகிறேன்.

இந்த ஆய்வின் கேள்விகளுக்கு பதிலளிப்பதில் உங்களுக்கு ஏதேனும் அசௌகரியங்கள் இருந்தால், எந்த நேரத்தில் வேண்டுமானாலும் ஆய்விலிருந்து விலகிக்கொள்ளும் உரிமை உங்களுக்கு உண்டு. ஆய்விலிருந்து விலகிக்கொள்வதால் உங்களுக்கு அளிக்கப்படும் சிகிச்சை முறையில் எந்த வித பாதிப்பும் இருக்காது என்று உங்களுக்கு உறுதியளிக்கிறோம். மருத்துவ மனையில் நோயாளிகளுக்கு அளிக்கப்படும் சேவைகளை நீங்கள் தொடர்ந்து பெறலாம். இந்த ஆய்வில் பங்கேற்க ஒப்புக்கொள்ளுவதால் வேறு எந்த விதமான கூடுதலான பலனும் உங்களுக்குக் கிடைக்காது. நீங்கள் அளிக்கும் தகவல்கள் இரகசியமாக வைக்கப்படும். ஆய்வில் பங்கேற்பவர்கள் பற்றியோ அவர்கள் குடும்பத்தைப் பற்றியோ எந்தத் தகவலும் எக்காரணம் கொண்டும் வெளியிடப்படாது என்று உறுதியளிக்கிறோம். நீங்கள் அளிக்கும் தகவல்கள் அங்கீகரிக்கப்பட்ட ஆய்விற்கு மட்டுமே பயன்படுத்தப்படும். இந்த ஆய்வு நடைபெறும் காலத்தில் குறிப்பிடத்தகுந்த புதிய கண்டுபிடிப்புகள் அல்லது பக்க விளைவுகள் ஏதும் ஏற்பட்டால் உங்களுக்குத் தெரிவிக்கப்படும். இதனால் ஆய்வில் தொடர்ந்து பங்கு பெறுவது பற்றிய உங்கள் நிலைப்பாட்டை நீங்கள் தெரிவிக்க ஏதுவாகும்.

ஆய்வுக்குட்படுபவரின் ஒப்புதல்: இந்த ஆய்வைப் பற்றிய மேற்கூறிய தகவல்களை நான் படித்து அறிந்து கொண்டேன் / ஆய்வாளர் படிக்கக் கேட்டுத் தெரிந்து கொண்டேன். ஆய்வினைப் பற்றி நன்றாகப் புரிந்து கொண்டு இந்த ஆய்வில் பங்கு பெற ஒப்புக்கொள்கிறேன். இந்த ஆய்வில் பங்கேற்பதற்கான எனது ஒப்புதலை கீழே கையொப்பமிட்டு. கை ரேகை பதித்து நான் தெரிவித்துக் கொள்கிறேன்.

பங்கேற்பாளரின் பெயர், முகவரி:

பங்கேற்பாளரின் கையொப்பம் / கை ரேகை / சட்டப்பூர்வ பிரதிநிதியின் கையொப்பம்:

தேதி :

ஆய்வாளரின் கையொப்பம்:

தேதி :

ஆய்வாளரின் தொலைபேசி எண்: 9543962077

மனித நெறிமுறைக் குழு அலுவலகத்தின் தொலைபேசி எண்:

அலுவலக நேரத்தில் 0422 2570170 Extn.: 5818

பங்கேற்பவரின் ஒப்புதல்

---------- ஆகிய எனக்கு இந்த ஆய்வுக்கான வழிமுறைகளைப் பற்றிய விளக்கம் விரிவாக அளிக்கப்பட்டது. இந்த ஆய்வைப்பற்றி கலந்து ஆலோசிக்கவும், கேள்விகள் கேற்பதற்கும் போதுமான வாய்ப்பு அளிக்கப்பட்டது. இந்த ஆய்வில் பங்கேற்பதன் மூலம் என் உடல் நலத்திற்கு எந்த தீமையும் நேரிடாது என்பதை நான் புரிந்து கொண்டேன். மேலே குறிப்பிட்டுள்ள ஆய்வில் நான் பங்கேற்கிறேன் என்று எனது மருத்துவரிடம் தெரிவிப்பதற்கு ஒப்பு கொள்கிறேன்.

பங்கு கொள்பவரின் பெயர்	கையொப்பம்	தேதி
சாட்சியாளரின் பெயர்	கையொப்பம்	தேதி
ஆய்வு மேற்கொள்பவரின் பெயர்	கையொப்பம்	தேதி

ANNEXURE –V

OUTCOME MEASURES

TRUNK IMPAIRMENT SCALE

The starting position for each item is the same. The patient is sitting on the edge of a bed or treatment table without back and arm support. The thighs make full contact with the bed or table, the feet are hip width apart and placed flat on the floor. The knee angle is 90^0. The arms rest on the legs. If hypertonia is present the position of the hemiplegic arm is taken as the starting position. The head and trunk are in a midline position.

If the patient scores 0 on the first item, the total score for the TIS is 0.

Each item of the test can be performed three times. The highest score counts. No practice session is allowed.

The patient can be corrected between the attempts.

The tests are verbally explained to the patient and can be demonstrated if needed.

ITEM

Static sitting balance

1. Starting position

	Patient falls or cannot maintain starting Position for 10 seconds without arm support - 0
	Patient can maintain starting position for 10 seconds - 2 If score = 0, then TIS total score = 0
2. Starting position Therapist crosses the unaffected leg over the hemiplegic leg	Patient falls or cannot maintain sitting position for 10 seconds without arm support - 0
	Patient can maintain sitting position for 10 seconds - 2

3. Starting position

Patient crosses the unaffected leg over the hemiplegic leg

Patient falls - 0

Patient cannot cross the legs without arm support on bed or table - 1

Patient crosses the legs but displaces the trunk more than 10 cm backwards or assists crossing with the hand - 2

Patient crosses the legs without trunk displacement or assistance - 3

Total static sitting balance - /7

Dynamic sitting balance

1. Starting position

Patient is instructed to touch the bed or table with the hemiplegic elbow (by shortening the hemiplegic side and lengthening the unaffected side) and return to the starting position

Patient falls, needs support from an upper extremity or the elbow does not touch the bed or table - 0

Patient moves actively without help, elbow touches bed or table - 1

If score = 0, then items 2 and 3 score 0

2. Repeat item 1

Patient demonstrates no or opposite shortening/lengthening - 0

Patient demonstrates appropriate shortening/lengthening - 1

If score = 0, then item 3 scores 0

3. Repeat item 1

Patient compensates.

Possible compensations are:

- use of upper extremity
- contralateral hip abduction

- hip flexion (if elbow touches bed or table further then proximal half of femur)
- knee flexion
- sliding of the feet -0

Patient moves without compensation - 1

4. Starting position
Patient is instructed to touch the bed or table with the unaffected elbow (by shortening the unaffected side and lengthening the hemiplegic side) and return to the starting position

Patient falls, needs support from an upper extremity or the elbow does not touch the bed or table - 0

Patient moves actively without help, elbow touches bed or table - 1
If score = 0, then items 5 and 6 score 0

5. Repeat item 4

Patient demonstrates no or opposite shortening/lengthening - 0

Patient demonstrates appropriate shortening/lengthening - 1
If score = 0, then item 6 scores 0

6. Repeat item 4

Patient compensates.
Possible compensations are:

- use of upper extremity,
- contralateral hip abduction,
- hip flexion (if elbow touches bed or table further then proximal half of femur)
- knee flexion,
- sliding of the feet - 0

Patient moves without compensation - 1

7. Starting position
Patient is instructed to lift pelvis
From bed or table at the hemiplegic side
(by shortening the hemiplegic side and
Lengthening the unaffected side)
And return to the starting position

Patient demonstrates no or opposite
shortening/lengthening - 0

Patient demonstrates appropriate
shortening/lengthening - 1
If score = 0, then item 8 scores 0

8. Repeat item 7

Patient compensates.
Possible compensations are:

- use of upper extremity,
- pushing off with the ipsilateral foot

(heel loses contact with the floor) - 0

Patient moves without compensation - 1

9. Starting position
Patient is instructed to lift pelvis
from the bed or table at the unaffected
side (by shortening the unaffected side and
lengthening the hemiplegic side)
and return to the starting position

Patient demonstrates no or opposite by
shortening and lengthening the
hemiplegic side) - 0

Patient demonstrates appropriate
Shortening/lengthening - 1
If score = 0, then item 10 scores 0

10. Repeat item 9

Patient compensates.
Possible compensations are:

- use of upper extremities,
- pushing off with the ipsilateral
  foot (heel loses contact with the floor - 0

Patient moves without compensation - 1

Total dynamic sitting balance- /10

Co-ordination

1. Starting position Patient is instructed to rotate upper trunk 6 times (every shoulder should be moved forward 3 times), first side that moves must be hemiplegic side, head should be fixated in starting position	Hemiplegic side is not moved three times Rotation is asymmetrical Rotation is symmetrical If score = 0, then item 2 scores 0	- 0 - 1 - 2
2. Repeat item 1 within 6 seconds	Rotation is asymmetrical Rotation is symmetrical	- 0 - 1
3. Starting position Patient is instructed to rotate lower trunk 6 times (every knee should be moved forward 3 times), first side that moves must be hemiplegic side, upper trunk should be fixated in starting position	Hemiplegic side is not moved three times Rotation is asymmetrical Rotation is symmetrical If score = 0, then item 4 scores 0	- 0 - 1 - 2
4. Repeat item 3 within 6 seconds	Rotation is asymmetrical Rotation is symmetrical	- 0 - 1

Total coordination- /6

Total Trunk Impairment Scale - /23

BERG BALANCE SCALE

The Berg Balance Scale (BBS) was developed to measure balance among older people with impairment in balance function by assessing the performance of functional tasks. It is a valid instrument used for evaluation of the effectiveness of interventions and for quantitative descriptions of function in clinical practice and research. The BBS has been evaluated in several reliability studies. A recent study of the BBS, which was completed in Finland, indicates that a change of eight (8) BBS points is required to reveal a genuine change in function between two assessments among older people who are dependent in ADL and living in residential care facilities.

Description:

- 14-item scale designed to measure balance of the older adult in a clinical setting.

Equipment needed:

- Ruler
- two standard chairs (one with arm rests, one without)
- Footstool or step
- stopwatch or wristwatch
- 15 ft walkway

Completion:

- Time: 15-20 minutes
- Scoring: A five-point scale, ranging from 0-4. "0" indicates the lowest level of function and "4" the highest level of function.

Total Score = 56

Interpretation:

- 41-56 = low fall risk
- 21-40 = medium fall risk
- 0 –20 = high fall risk

A change of 8 points is required to reveal a genuine change in function between 2 assessments.

Berg Balance Scale

Name: _____ Date: _____

Location: _____ Rater: _____

ITEM DESCRIPTION	SCORE (0-4)
Sitting to standing	_____
Standing unsupported	_____
Sitting unsupported	_____
Standing to sitting	_____
Transfers	_____
Standing with eyes closed	_____
Standing with feet together	_____
Reaching forward with outstretched arm	_____
Retrieving object from floor	_____
Turning to look behind	_____
Turning 360 degrees	_____
Placing alternate foot on stool	_____
Standing with one foot in front	_____
Standing on one foot	_____

Total _____

INDIVIDUAL TASK SCORING

SITTING TO STANDING

INSTRUCTIONS: Please stand up. Try not to use your hand for support.

- 4 able to stand without using hands and stabilize independently
- 3 able to stand independently using hands
- 2 able to stand using hands after several tries
- 1 needs minimal aid to stand or stabilize
- 0 needs moderate or maximal assist to stand

STANDING UNSUPPORTED

INSTRUCTIONS: Please stand for two minutes without holding on.

- 4 able to stand safely for 2 minutes
- 3 able to stand 2 minutes with supervision
- 2 able to stand 30 seconds unsupported
- 1 needs several tries to stand 30 seconds unsupported
- 0 unable to stand 30 seconds unsupported

If a subject is able to stand 2 minutes unsupported, score full points for sitting unsupported. Proceed to item #4.

SITTING WITH BACK UNSUPPORTED BUT FEET SUPPORTED ON FLOOR OR ON A STOOL

INSTRUCTIONS: Please sit with arms folded for 2 minutes.

- 4 able to sit safely and securely for 2 minutes
- 3 able to sit 2 minutes under supervision
- 2 able to able to sit 30 seconds
- 1 able to sit 10 seconds
- 0 unable to sit without support 10 seconds

STANDING TO SITTING

INSTRUCTIONS: Please sit down.

- 4 sits safely with minimal use of hands
- 3 controls descent by using hands
- 2 uses back of legs against chair to control descent
- 1 sits independently but has uncontrolled descent
- 0 needs assist to sit

TRANSFERS

INSTRUCTIONS: Arrange chair(s) for pivot transfer. Ask subject to transfer one way toward a seat with armrests and one way toward a seat without armrests. You may use two chairs (one with and one without armrests) or a bed and a chair.

- 4 able to transfer safely with minor use of hands
- 3 able to transfer safely definite need of hands
- 2 able to transfer with verbal cuing and/or supervision
- 1 needs one person to assist
- 0 needs two people to assist or supervise to be safe

STANDING UNSUPPORTED WITH EYES CLOSED

INSTRUCTIONS: Please close your eyes and stand still for 10 seconds.

- 4 able to stand 10 seconds safely
- 3 able to stand 10 seconds with supervision
- 2 able to stand 3 seconds
- 1 unable to keep eyes closed 3 seconds but stays safely
- 0 needs help to keep from falling

STANDING UNSUPPORTED WITH FEET TOGETHER

INSTRUCTIONS: Place your feet together and stand without holding on.

- 4 able to place feet together independently and stand 1 minute safely
- 3 able to place feet together independently and stand 1 minute with supervision
- 2 able to place feet together independently but unable to hold for 30 seconds
- 1 needs help to attain position but able to stand 15 seconds feet together
- 0 needs help to attain position and unable to hold for 15 seconds

REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING

INSTRUCTIONS: Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can. (Examiner places a ruler at the end of fingertips when arm is at 90 degrees. Fingers should not touch the ruler while reaching forward. The recorded measure is the distance forward that the fingers reach while the subject is in the most forward lean position. When possible, ask subject to use both arms when reaching to avoid rotation of the trunk.)

- 4 can reach forward confidently 25 cm (10 inches)
- 3 can reach forward 12 cm (5 inches)
- 2 can reach forward 5 cm (2 inches)
- 1 reaches forward but needs supervision
- 0 loses balance while trying/requires external support

PICK UP OBJECT FROM THE FLOOR FROM A STANDING POSITION

INSTRUCTIONS: Pick up the shoe/slipper, which is in front of your feet.

- 4 able to pick up slipper safely and easily
- 3 able to pick up slipper but needs supervision
- 2 unable to pick up but reaches 2-5 cm (1-2 inches) from slipper and keeps balance independently
- 1 unable to pick up and needs supervision while trying
- 0 unable to try/needs assist to keep from losing balance or falling

TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING

INSTRUCTIONS: Turn to look directly behind you over toward the left shoulder. Repeat to the right. (Examiner may pick an object to look at directly behind the subject to encourage a better twist turn.)

- 4 looks behind from both sides and weight shifts well
- 3 looks behind one side only other side shows less weight shift
- 2 turns sideways only but maintains balance
- 1 needs supervision when turning
- 0 needs assist to keep from losing balance or falling

TURN 360 DEGREES

INSTRUCTIONS: Turn completely around in a full circle. Pause. Then turn a full circle in the other direction.

- 4 able to turn 360 degrees safely in 4 seconds or less
- 3 able to turn 360 degrees safely one side only 4 seconds or less
- 2 able to turn 360 degrees safely but slowly
- 1 needs close supervision or verbal cuing
- 0 needs assistance while turning

PLACE ALTERNATE FOOT ON STEP OR STOOL WHILE STANDING UNSUPPORTED

INSTRUCTIONS: Place each foot alternately on the step/stool. Continue until each foot has touched the step/stool four times.

- 4 able to stand independently and safely and complete 8 steps in 20 seconds
- 3 able to stand independently and complete 8 steps in > 20 seconds
- 2 able to complete 4 steps without aid with supervision
- 1 able to complete > 2 steps needs minimal assist
- 0 needs assistance to keep from falling/unable to try

STANDING UNSUPPORTED ONE FOOT IN FRONT

INSTRUCTIONS: (DEMONSTRATE TO SUBJECT) Place one foot directly in front of the other. If you feel that you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot. (To score 3 points, the length of the step should exceed the length of the other foot and the width of the stance should approximate the subject's normal stride width.)

- 4 able to place foot tandem independently and hold 30 seconds
- 3 able to place foot ahead independently and hold 30 seconds
- 2 able to take small step independently and hold 30 seconds
- 1 needs help to step but can hold 15 seconds
- 0 loses balance while stepping or standing

STANDING ON ONE LEG

INSTRUCTIONS: Stand on one leg as long as you can without holding on.

- 4 able to lift leg independently and hold > 10 seconds
- 3 able to lift leg independently and hold 5-10 seconds
- 2 able to lift leg independently and hold ≥ 3 seconds
- 1 tries to lift leg unable to hold 3 seconds but remains standing independently.
- 0 unable to try of needs assist to prevent fall

TOTAL SCORE - Maximum - 56

ANNEXURE – VI

TREATMENT PROTOCOL

GROUP A – PELVIC BRIDGING USING SLING WITH HIP ABDUCTION

Sample Size - 6 (n=6)

- ✓ **Treatment duration per session** – 10 repetitions per set for 3 sets, 1 session per day (6 sessions per week) continued for 2 weeks (40 minutes).
- ✓ **Point of axis** – Anterior superior iliac spine of affected side.
- ✓ **Placement of sling** – In the knee and heel of the affected side.

Starting Position

- Supine lying with the affected limb placed in the sling with hip abduction to 30^{o} by using a wedge in between the limbs.
- Sling height- Affected limb supported in the sling with an angle of 30^{o} of hip flexion.
- Unaffected limb knee flexion is in 90 and 120 degrees.

Command

- Lift your pelvis up, hold it for 5 seconds and place the pelvis down with rest period of 1 minute.

CONVENTIONAL PHYSIOTHERAPY:

- Tone facilitation techniques.
- Range of movement exercises.
- Strengthening exercises.

GROUP B – PELVIC BRIDGING USING SLING WITHOUT HIP ABDUCTION

Sample Size - 6 (n=6)

- ✓ **Treatment duration per session** – 10 repetitions per set for 3 sets, 1 session per day (6 sessions per week) continued for 2 weeks (40 minutes).
- ✓ **Point of axis** – Anterior superior iliac spine of affected side.
- ✓ **Placement of sling** – In the knee and heel of the affected side.

Starting Position

- Supine lying with the affected limb placed in the sling with hip adduction (0^o).
- Sling height- Affected limb supported in the sling with an angle of 30^o of hip flexion.
- Unaffected limb knee flexion is in 90 and 120 degrees.

Command

- Lift your pelvis up, hold it for 5 seconds and place the pelvis down with rest period of 1 minute.

CONVENTIONAL PHYSIOTHERAPY:

- Tone facilitation techniques.
- Range of movement exercises.
- Strengthening exercises.

TREATMENT PROCEDURE

ABSTRACT

COMPARING THE EFFICACY OF ONE LEGGED BRIDGING WITH AND WITHOUT HIP ABDUCTION USING A SLING ON CONTRALATERAL SIDE ON TRUNK STABILITY AND BALANCE IN POST STROKE PATIENTS

BACKGROUND: Stroke is the second leading cause of death and a major cause of long term disability. Hemiplegia is a main symptom of stroke, which results a decrease in trunk adjustment ability. Many rehabilitation interventions have been imposed to strengthen the trunk and hip extensor muscles to improve trunk stability and balance. One of such an intervention using a sling, one legged bridging with hip abduction has an effect of increase the trunk stability by neutralizing the pelvis by gluteus maximus contraction. One legged bridging without hip abduction is also a form of intervention which increases the trunk stability by contracting the adductor magnus that reduces the intra pelvic space and adjust the joint position to contract the abdominal muscle. This study compares the efficacy of biomechanical relationship of one legged bridging with hip abduction and functional relationship of one legged bridging without hip abduction on improving the trunk stability and balance in post stroke patients.

Objective: To compare the efficacy of one legged pelvic bridging with and without hip abduction using a sling on contralateral side on trunk stability and balance in stroke patients.

Design: Prospective Quasi experimental study design (pre-test and post-test with treatment comparison).

Setting: Department of Neurology, Department of PMR (SRC), PSG hospitals, Coimbatore.

Participants: Group A: 6 subjects received one legged bridging with hip abduction
Group B: 6 subjects received one legged bridging without hip abduction.

Interventions: Group A: 10 repetitions per set for 3 sets, 1 session per day continued for 2 weeks (40 minutes)
Group B: 10 repetitions per set for 3 sets, 1 session per day continued for 2 weeks (40 minutes)

Outcome measures: Trunk impairment scale (TIS)
Berg balance scale (BBS)

Results: All participants in Group-A and Group-B showed significant improvement in TIS with a mean difference of 5.500 and 1.833 respectively. The calculated‘t’ value using the paired‘t’ test for Group A and B were 11.000 and 4.568 ($p<0.05$) respectively. In BBS, Group-A and Group-B showed significant improvement with a mean difference of 1.666 and 1.166 respectively. The calculated‘t’ value using the paired‘t’ test for Group A and B were 7.906 and 7.000 ($p<0.05$) respectively. When comparing between the groups using independent‘t’ test, the TIS showed mean difference of 3.667 and‘t’ value of 4.778 ($p<0.05$), BBS showed mean difference of 0.667 and‘t’ value of 1.690 ($p>0.05$).

Conclusion: One legged bridging with hip abduction is effective in comparing with one legged bridging without hip abduction on improving the trunk stability but the balance is not clear by a short period of intervention using a sling on contralateral side in post stroke patients.

Key words: Pelvic bridging, Trunk stability, Balance